Chapter 15

A Social Network Model for Understanding Technology Use for Knowledge– Intensive Workers

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ABSTRACT

This chapter presents a theoretical model based on social network theories and the social influence model for understanding how knowledge professionals utilise technology. In particular, the association between egocentric network properties (structure, position and tie) and information and communication technology (ICT) use of individuals in knowledge-intensive and geographically dispersed settings is explored. A novel triangulation methodology is adopted where in-depth interviews and observation techniques were utilised to develop constructs for the conceptual model which were then vetted by domain-level experts. A reliable and validated social network-based questionnaire survey is also developed to operationalise the model. Results show that task-level ICT use is significantly associated with degree centrality and functional tie-diversity; and communication-level ICT use is negatively associated with efficiency. The implications of these associations for knowledge-intensive work mean that it is important to consider the professional social network characteristics of potential users of the technology for designing ICT-enabled organisations.

INTRODUCTION

Traditional information systems, management and organisation science literature have documented the implementation and use of technology as being crucial for accomplishing organisational goals es-

pecially when there exists a good task-technology fit. With rapid developments in technology, there exists a secondary effect of technology use in that information can now traverse spatial, structural and temporal boundaries thus redefining work structures and communication patterns (Sproull & Kiesler, 1991). Consequently, information science and information systems researchers have sought

to understand the social processes that influence the use of such information and communication technologies (ICT). While there are competing models and theories that explain technology use such as the technology acceptance model (Davis et al., 1989) and the social influence model (Fulk et al., 1990), only a few have focused on the significance of social structure, social position and social ties that constitute the influence (Sykes et al., 2009; Chung & Hossain, 2010). A key tenet in this study is that understanding the relationship between social network properties and ICT use of individuals is fundamental to the design of an effective information based organisation. In this study, the motivating questions are: at the individual level, (1) what forms of network structure are conducive to ICT use at the task and sociological levels? (2) what network position influences ICT use for task and communication purposes? (3) does personal experience or geographical co-location of peers shape ICT use more so than an individual's social network property in distributed work settings? (4) how does one account for social factors that are important for designing and implementing ICT for enhanced performance?

A theoretical framework is developed based on the theory of structural holes, strength of weak tie theory and the social influence model for understanding how individuals in knowledge-intensive work use ICT for task and communication purposes. The framework is guided by the question that if the social influence model is based on the precept that people act towards things based on the meanings that the things have for them, and that the meaning of these things is derived out of social interaction with others and is always changing, then a subsequent question is what form of social structures and positions constitute these interactions that influences the meaning of things?

In attempting to answer this question, the model is operationalised in the context of individuals whose work is both knowledge-intensive and geographically isolated, and where the uptake of ICT has been of considerable governmental inter-est recently. In the following sections, I highlight the need for a social networks perspective into understanding ICT use by reviewing literature on social networks and current models for explaining ICT use along with justified hypotheses. I then describe the domain for this research followed by results and discussion.

CONCEPTUAL FOUNDATIONS

The revolution of technology and internet means that the entire communication environment has taken on a virtual dimension. Personal relations are no longer conducted face-to-face only and various forms of ICT are currently available for various purposes (e.g. blogs, wikis, social networking sites like Facebook, Linkedin and so on). Thus, personal networks not only shape the ICT for communication, but the patterns and frequency of ICT use are also shaping personal networks and re drawing social boundaries.

Models of ICT Use

In light of the above discussion, there have been several theories and models that propose to conceptualise ICT use. Drawing on structuration theory as an analytic perspective to view the use of ICT, Orlikowski (1992) presented a model of interaction among institutional properties, technology, and human action. Her argument is that technology is an outcome of human action, which is sustained by ICT use, which in turn mediates human action by facilitating or constraining performance. Furthermore, human action, in using technology acts upon the institutional properties of an organisation such as structure, which can, for example, be described in terms of professional ties that link information workers together. In sum, human actions in ICT use shape and are shaped by such structural properties.

Other scholars attempted to conceptualise ICT use based on the factors contributing to individual

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